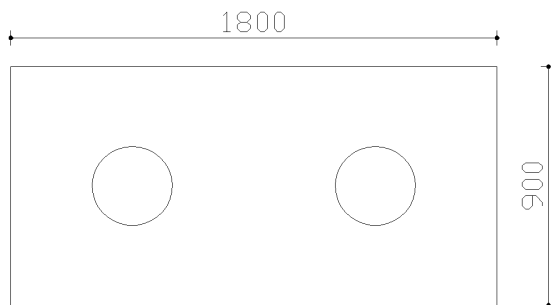


## BAB XI

### PERHITUNGAN PILE CAP P2

#### 11.1 Penulangan Lentur Pile Cap



##### Momen pada poer :

Reaksi dari pondasi  $P_{max} := 30608 \text{ kg}$  ( daya dukung maksimum pondasi )

$M_u := 1(1.4 \cdot P_{max} \cdot 0.1) = 4285.12 \text{ kgm}$

Adapun data - data perencanaan untuk penulangan pondasi :

- Tebal pelat :  $h := 350 \text{ mm}$
- Tebal decking  $s := 70 \text{ mm}$
- Diameter tulangan rencana D13
- Mutu tulangan baja  $f_y := 390 \text{ Mpa}$
- Mutu beton  $f_c := 18.675 \text{ Mpa}$
- daksen  $:= 70 + 13 = 83 \text{ mm}$   $b := 1800 \text{ mm}$
- $d := h - \text{daksen} = 267 \text{ mm}$   $\beta := 0.85$

Berdasarkan SNI 2847 pasal 10.4.3 :

$$\rho_{balance} := \frac{0.85 \cdot \beta \cdot f_c \cdot \left( \frac{600}{600 + f_y} \right)}{f_y} = 0.021$$

$$\rho_{max} := 0.75 \cdot \rho_{balance} = 0.016$$

Berdasarkan SNI 03-2847-2002 pasal 9.12.2

$$\rho_{min} := \frac{1.4}{f_y} = 0.004$$

$$m := \frac{f_y}{0.85 \cdot f_c} = 24.569$$

$$M_n := \frac{M_u \cdot 9.81 \cdot 1000}{0.8} = 52546284 \text{ Nmm}$$

ambil :  $\delta := 0.4$

$$R_n := \frac{(1 - \delta) M_n}{b \cdot d^2} = 0.246 \text{ N/mm}^2$$

$$\rho - \text{paksen} := \frac{\left(1 - \sqrt{1 - \frac{2m \cdot R_n}{f_y}}\right)}{m} = 0.0006$$

$$\rho_{\text{paksen}} := \frac{\delta \cdot M_n}{f_y \cdot (d - d_{\text{aksen}}) \cdot b \cdot d} = 0.0006$$

$$\rho := 0.0006 + 0.0006 = 0.0012 \quad \blacksquare < \blacksquare \quad \rho_{\min} = 0.0036$$

$$A_{\text{asperlu}} := \rho_{\min} \cdot b \cdot d = 865.846 \text{ mm}^2$$

#### **Pasang tulangan tarik D13-150**

$$A_s := 11 \cdot 0.785 \cdot 13^2 = 1459.315 \text{ mm}^2 \quad \blacksquare > \blacksquare \quad A_{\text{asperlu}} = 865.846 \text{ mm}^2$$

#### **Pasang tulangan lentur D13-150 untuk tulangan tarik & D13-150 untuk tulangan tekan**

#### • **Kontrol Geser Pons**

##### • **Beban Aksial Kolom**

Perencanaan penampang akibat geser didasarkan pada beban aksial kolom

$$N_{uk} := 52.283 \text{ kN}$$

- Dengan persyaratan  $V_u < V_c$  ( gaya geser ultimate harus lebih kecil dari kuat geser nominalnya ).

$$\text{tebal poer } t_p := 35 \text{ cm}$$

$$\text{dimensi kolom } 35/35$$

$$b_o := 0.5 \cdot t_p + 35 + 0.5 \cdot t_p = 70 \text{ cm}$$

$$d_o := 0.5 \cdot t_p + 35 + 0.5 \cdot t_p = 70 \text{ cm}$$

##### • **Keliling Kritis**

$$U := 2 \cdot (b_o + d_o) = 280 \text{ cm}$$

##### • **Luas Kritis**

$$A_k := U \cdot t_p = 9800 \text{ cm}^2$$

##### • **Kekutan Geser Beton**

$$\beta_c := \frac{35}{35} = 1$$

$$d := t_p - 14 - 2 \cdot 0.65 = 19.7 \text{ cm}$$

$$V_c := \left(1 + \frac{2}{\beta_c}\right) \cdot \frac{\sqrt{f_c} \cdot U \cdot d \cdot 100}{6 \cdot 10^3} = 1191.858 \text{ kN} \quad \text{.. SNI 2847 pasal 13.12.2.1}$$

$$\text{Syarat } V_u \leq \phi V_c$$

$$\phi := 0.75$$

$$N_{uk} = 52.283 \text{ kN} \quad \blacksquare < \blacksquare \quad \phi \cdot V_c = 893.894 \text{ kN} \quad \text{..... OK!!!}$$

